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ANNUAL REPORT

OF

THE DIRECTOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE

TO THE

PRESIDENT AND FELLOWS OF HARVARD COLLEGE

FOR

1928-1929.

CAMBRIDGE, U. S. A.:

PRINTED FOR THE MUSEUM

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PUBLICATIONS
OF THE
MUSEUM OF COMPARATIVE ZOÖLOGY
AT HARVARD COLLEGE.

There have been published of the BULLETIN Vols. I. to LIV., LVI. to LXVIII.; of the MEMOIRS, Vols. I. to XLII., and also XLIV. to XLIX., and LI.

The BULLETIN and MEMOIRS are devoted to the publication of original work by the Officers of the Museum, of investigations carried on by students and others in the different Laboratories of Natural History, and of work by specialists based upon the Museum Collections and Explorations.

These publications are issued in numbers at irregular intervals. Each number of the Bulletin and of the Memoirs may be sold separately. A price list of the publications of the Museum will be sent on application to the Director of the Museum of Comparative Zoölogy, Cambridge, Mass.

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MUSEUM OF COMPARATIVE ZOÖLOGY.

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WINTHROP SPRAGUE BROOKS	<i>Custodian of Birds' Eggs and Nests</i>
ELIZABETH DEICHMANN	<i>Agassiz Fellow in Invertebrate Zoölogy</i>
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NICHOLAS BORODIN	<i>Curator of Fishes</i>
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REGINALD A. DALY	<i>Sturgis Hooper Professor of Geology</i>
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REPORT OF THE DIRECTOR

1928-1929

TO THE PRESIDENT AND FELLOWS OF HARVARD COLLEGE: —

The changes in the building, which were somewhat fully described in the last Annual Report, have been completed. These changes have allowed as much expansion of space for the storage of collections and for additional working quarters as will be possible until the removal of the zoölogical laboratories when the new Biological Building is finished. The flooring over of the North American gallery, by Mr. G. R. Agassiz's generosity, and the flooring over of the South American gallery make it possible to provide laboratory space for the entomologists at present working in the old Bussey Building. This will give them convenient access to our entomological collections and library a year or more in advance of the time they would have moved to Cambridge to enter the new building. Additional storage and laboratory space is still urgently needed for several of the rapidly expanding departments of the Museum. This situation, however, will be cared for adequately within the next two years.

The reception of heat from the central heating plant has made it possible to remove our boilers. The new heat has proved to be cheaper, much more efficiently distributed and, of course, the building is infinitely cleaner than it ever was when we attempted our own heating. The new electric lighting, the interdepartmental telephones and elevator have so greatly improved working conditions that it is hard to believe that these conditions, so long needed, have existed for but a short time.

The new benches which have been placed in the exhibition rooms have also filled a long-felt want, besides improving the appearance of the rooms.

The addition of photographs, placed beside many exhibition specimens and which show the animals in life and in their natural habitat, is also an innovation which has added greatly to the educational value of the exhibits.

The new temporary exhibits of Recent Accessions have proved highly interesting to the public and the cases devoted to these, on the main exhibition floor, have been filled and refilled a number of times during the year. The rediscovery of Professor Peck's preparations of fishes prepared between 1783 and 1790 have been deemed of sufficient importance to be made a permanent exhibit. His specimens were recently found by chance after years of neglect and enough of them were still sufficiently well preserved to show his curious attempt to mount and preserve fish after the manner of herbarium specimens. They are the oldest zoölogical specimens in the possession of the University prepared by anyone connected with Harvard College. With the generous assistance of Professor Theodore Lyman, who provided not only funds but also a picture of Professor Agassiz's hut on the Aar Glacier, of great historical interest, it has been possible to prepare a permanent memorial to Monsieur Jacques Burkhardt, a lifelong friend of Professor Agassiz and for many years his artist and a member of his household. In this exhibit are shown a few of his superb zoölogical drawings and many sketches made during the Thayer Expedition to Brazil. These were evidently prepared to illustrate a book on the journey which never was published. The painting of the Hôtel des Neuchatelois, given by Dr. Theodore Lyman and his brother, Dr. Henry Lyman, and which was originally a gift from Mr. Burkhardt to Mr. Theodore Lyman, Sr., bears the following marginal inscription in Professor Agassiz's handwriting:

While residing upon this glacier and tracing the connection of the features it now presents with the phenomena of an earlier period, of which it is but a miniature representation, I have often been impressed with the importance for the philosopher, of magnifying or reducing the facts which may be within his reach to such an extent that they may become a living representation of another state of things.

L. AGASSIZ, Cambridge, 3 February 1861.

A suitable bronze tablet, designed by Mr. C. Howard Walker, has been placed on the wall adjoining this exhibit.

Several new specimens of high teaching value have been placed on exhibition in the Palaeontological Rooms. Material for an ex-

position of the evolutionary history of the horses is now in the Museum and in part prepared and on exhibition. A number of these new fossils were mounted and prepared by Mr. George Nelson and show his characteristic skill and ability. The Brazilian Jaguar, which long held a prominent place in the South American Room and which was hideously mounted, has been replaced by a magnificent specimen from Paraguay, a gift in the flesh of the Zoölogical Society of New York, while for a new Fur Seal skin now mounted in the Marine Mammal Room we have to thank the United States Bureau of Fisheries.

During the past year Mr. Erich M. Schlaikjer with three associates, Messrs. Edward Shields, George Bryant and Charles E. Tilton, Jr., and with aid from C. E. Tilton, Esq., made another fruitful trip in search of vertebrate fossils in South Dakota and Nebraska with great success. Mr. Clench visited Cuba, bringing back some interesting land mollusks from this seemingly inexhaustible fauna. Mr. Columbus O'D. Iselin made a voyage to the mid-Atlantic, securing a splendid series of deep sea fishes as well as oceanographic data and bottom cores, concerning which he is now preparing a report. He has been reappointed by the Faculty of the Museum Alexander Agassiz Fellow in Oceanography.

Mr. W. S. Brooks had the unexpected good fortune of being able to visit and make collections of great value on Cocos Island and on several of the Galapagos Islands. This visit was made possible by H. R. Hardwick '15, whose guest Mr. Brooks was, on the "Arcadia."

By the great kindness of Mr. Allison V. Armour I was enabled last winter and spring to visit many of the West Indies and northern South America on his yacht "Utowana." This ship, a Swedish tramp steamer remodeled to provide excellent laboratory space, had previously made notable voyages to the Mediterranean region and down the West Coast of Africa when Professor W. M. Wheeler and Dr. David Fairchild were guests. Last winter's cruise enabled me to visit Cuba, Haiti, Beata Island, San Domingo, Saba, St. Kitts, Antigua, Nevis, Guadeloupe, Marie Galante, Dominica, Martinique, St. Lucia, Barbados, St. Vincent, Carriacou, Grenada, Tobago, Trinidad and Curaçao, as well as numerous points along the South American and Central American coasts. Information of

interest concerning the present status of the fast-changing Antillean fauna and many desirable zoölogical specimens were secured, as well as the seeds of a large number of highly interesting economic and ornamental plants which were distributed to the Harvard Botanic Garden at Soledad, to the Office of Foreign Seed and Plant Introduction of the United States Department of Agriculture, to the Plant Introduction Garden at Summit in the Panama Canal Zone and to the United Fruit Company's Experimental Station at Lancetilla, Honduras.

In coöperation with the United States National Museum, Mr. C. P. Singleton continued to excavate in the Pleistocene deposits near Melbourne, Florida, during the months when he was not employed by Dr. Gidley. Dr. Gidley is preparing a report on this material. The described specimens then will be forwarded to Cambridge — that is those which were obtained by Mr. Singleton during the half year in which he was working for us.

In accordance with a desire to make the Museum as widely useful as possible laboratory space has been provided for a number of the scientific assistants in the employ of the United States Bureau of Fisheries whose work is allied to the interests of Dr. H. B. Bigelow, the Museum's principal oceanographer. The following letter from the Acting Chief of the Bureau would indicate that this arrangement has been satisfactory and is likely to continue.

Dear Dr. Barbour,

May 31, 1929

On behalf of the Bureau of Fisheries, I wish to thank you for your courtesy in providing space at the Museum of Comparative Zoölogy for the use of this bureau's employes while engaged on North Atlantic fishery research problems during the past year. The laboratory and library facilities were most satisfactory, and the opportunities of consulting members of the Museum's staff were exceptionally valuable in the prosecution of the bureau's program of research. The coöperation of the Museum of Comparative Zoölogy was indeed greatly appreciated and we hope that the arrangement may be continued during the next and future years.

Very truly yours,

(Signed) LEWIS RADCLIFFE

Acting Commissioner of Fisheries

By an arrangement with the Department of Tropical Medicine, Dr. J. H. Sandground joined the Staff of the Museum as Curator of Helminthology. He will work for part of his time at the Museum, developing principally the collection of parasitic worms, especially those infecting man and the higher animals. Dr. N. Borodin has been appointed Curator of Fishes for the coming year and Dr. Herbert Friedmann, who had been but a few months before appointed Associate in African Ornithology, has resigned to accept a position as head of the Department of Birds of the United States National Museum. Mr. W.S. Brooks has been appointed Custodian of Birds' Nests and Eggs.

Thanks principally to Mr. Griscom's and Dr. Allen's editorial skill, a number of memoirs and bulletins have been published during the year and others are in press. A list of these will be found in the bibliography.

Miss Elizabeth Deichmann has continued her efforts to make possible the publication of the Report on the Blake Alcyonarian Corals, unfinished when Professor A. E. Verrill died. It has been possible to reduce the volume of text by nearly two-thirds. Unfortunately a vast number of the plates, the full edition of which was printed years before the manuscript was completed, will not be usable for the revised report. Miss Deichmann has the manuscript practically finished and is preparing some new illustrations so that it is to be hoped that the whole report will be completed within a few months. Miss Deichmann has again been awarded a research Fellowship from the Alexander Agassiz "Albatross" Fund.

The Museum is indeed fortunate in its friends and in the long-suffering devotion of its Staff. Its salaries are still inadequate, with no immediate amelioration in sight. Nevertheless, every person connected with the Museum has worked devotedly to make the best possible use of the large amount of material which the Museum continues to receive from many sources.

The reports of the curators concerning the activities of their several departments follow. Research work will now go forward with less interruption since certain other necessary but temporary tasks are fast approaching completion.

Respectfully,

THOMAS BARBOUR, *Director*

REPORT ON THE BIRDS

BY OUTRAM BANGS

During the year 3,755 specimens have been received. This includes 17 genera new to the Museum. Of species listed in Sharpe's Hand List we have added 351, besides a number, now recognized, that have been brought to light since the publication of that work.

The more important collections received have been as follows: 1,932 birds from the La Touche Collection of Chinese birds; 619 from Darien collected by R. R. Benson, this collection, which has been reported upon by Ludlow Griscom, contains besides a number of new forms, the second taking of *Praedo* and *Hylospingus*; 133 birds collected in Labrador during last summer by Oliver L. Austin, Jr., which he has kindly presented to the Museum; 199 birds from the Santa Marta region of Colombia, taken by P. J. Darlington, Jr. and presented by him. This collection, remarkable in that it was made only in Mr. Darlington's spare time and while he was working as an economic entomologist for the United Fruit Company, nevertheless contains a large number of most interesting "takes." Mr. Darlington is writing a report on it. We have also gotten 202 birds from Almirante, Panama, collected by H. Wedel. Three hundred and fifty-six skins were purchased from European dealers.

By exchange 273 birds were received.

Colonel John E. Thayer has deposited in the Museum the types of *Egretta candidissima brewsteri*, *Ardea herodias sanctae-luciae* and *Toxostoma rediviva helva* described by Thayer and Bangs; and the type of *Troglodytes parkmani* Audubon. This historic specimen was presented to Parkman by Audubon and had remained, together with Audubon's letter to Parkman transmitting the specimen to him, in the Parkman family, until secured by Col. Thayer.

Small lots or single specimens, in all 37 specimens, were received from Peabody Museum; L. Griscom; Oliver L. Austin, Jr.; J. Van Tyne; Mrs. Lida Brown; Rev. Rufus Le Fevre; J. H. Sandground;

T. E. Penard; John E. Thayer and the Commonwealth of Massachusetts.

Exchanges were made with: Berlin Museum; Leiden Museum; Stockholm Museum; Museum of Zoölogy, Cambridge, England; Tring Museum; Academy of Sciences, Leningrad; Durban Museum, Natal; Musée l'Herminier, Guadeloupe; Redpath Museum of McGill University; American Museum of Natural History; Field Museum; Carnegie Museum; Cleveland Museum; U. S. Bureau of Biological Survey; Ohio State Museum; Museum of Wesleyan University; Judge Bon of France and Stuart T. Danforth.

A large number of specimens has been loaned to the following institutions and individuals: U. S. National Museum, American Museum of Natural History, Museum of Vertebrate Zoölogy, Field Museum, Carnegie Museum, National Museum of Canada, Rear Admiral Hubert Lynes; Donald R. Dickey, J. Eugene Law, W. B. Conover, and A. J. van Rossem.

Mr. Peters has, during the year, carded 10,807 specimens.

On August 1, Dr. Herbert Friedmann resigned as Associate in African Ornithology to become Curator of Birds in the United States National Museum. Otherwise the working force in the bird rooms remains the same.

Mrs. Earl Bowen has been a most skilled and devoted assistant during the year.

REPORT ON MARINE INVERTEBRATES

BY T. BARBOUR

Professor Hubert Lyman Clark is exploring the marine invertebrate fauna of a long stretch of coast line in northwestern Australia which is almost wholly unknown zoologically.

Dr. Clark's journey was aided by a grant from the Carnegie Institution and he is working in coöperation with the Australian Research Council which has generously supplied additional funds and an assistant. Dr. Clark will be in Cambridge for the second half year.

The collection of Schizopod crustacea has been studied by Professor Zimmer of Berlin and other groups of crustacea by Dr. Roderick Macdonald of Glasgow and Miss Mary J. Rathbun of the United States National Museum. A considerable collection of marine invertebrates has been donated, which was made by Mr. Walter Eyerdam on the coast of Kamchatka and Alaska. Marine invertebrates from the south coast of Cuba were also secured by Dr. J. A. Dawson while on a visit to the Soledad Laboratory.

REPORT OF THE DEPARTMENT OF OCEANOGRAPHY

BY H. B. BIGELOW

As in past years, the Museum has carried out oceanographic explorations both independently and in coöperation with the United States Bureau of Fisheries and the International Ice Patrol.

Periodic cruises of the Fisheries Steamer "Albatross," in November, February, March, April, May and June, in charge of Messrs. W. C. Schroeder and O. E. Sette, of the Bureau, continued the joint survey of the oceanic sector between Cape Cod and North Carolina. During the winter, systematic study of the physical data thus obtained, and of the plankton was continued in the Museum by Messrs. Sette and Bailey of the Bureau, and by Dr. Macdonald.

Mr. W. C. Schroeder working, as heretofore, in the Museum, has nearly completed his report on the biology and migration of the Cod of the Nantucket Shoals region.

The Museum also serves as headquarters for the studies that the Bureau is carrying out on the natural history of the mackerel and of the weakfish, the members of the Bureau in charge of these projects being stationed in the Museum, working under the general oversight of the Curator of Oceanography. The Oceanographer of the International Ice Patrol was also stationed in the Museum, as in the past; and the Curator continues to serve as scientific advisor to the Patrol.

The most important field work carried out independently by the Museum was Mr. Iselin's Atlantic traverse on his schooner "Atlantis," during August and September, mentioned briefly in the past year's report on this Department. Two profiles of temperatures and salinity were obtained across the western and northern sectors of the Gulf Stream; ten towing stations were occupied at a depth of 800 to 1,000 fathoms; and cores of the deep sea ooze were obtained at eight stations in depths up to 1,600 fathoms, with the new apparatus, several of them more than three feet in length.

The biological gatherings were extensive, adding large series of Bathypelagic Fishes, Crustacea, Medusae and other invertebrates to the Museum collections. During the rest of the year Mr. Iselin has been engaged in the study of the stratification of deep sea deposits shown by these cores, and in the continuation of his work on the dynamics of the Gulf Stream.

Dr. Roderick Macdonald, Carnegie Fellow of the Scottish Universities, and holder of the Virginia Barrett Gibbs Fellowship, spent the year in the Oceanographic Laboratory, engaged on a general survey of the distribution of the Euphausiacea of the eastern seaboard of America. In April he accompanied one of the Ice Patrol Cruises to the Grand Banks. He has also prepared a report on the Cirripeds collected by the "Albatross" in 1891 and 1904-5, which had been returned by Professor H. J. Hansen.

In April and May Miss Maurine Leslie of the Scripps Institution of La Jolla, California, visited the Museum to collaborate in the report on the Monterey Exploration of 1928, now completed. Miss Alice Beale and Miss Mary Sears were employed, for part of the year, in the identification of the plankton of this collection.

Much of my own time during the year has been devoted to the work of the Committee on Oceanography of the National Academy of Sciences.

ENTOMOLOGICAL DEPARTMENT

BY NATHAN BANKS

The largest accession was the gift by Dr. W. M. Wheeler of his Hymenoptera, other than ants, about 20,000 specimens. He also presented a large number of alcoholic insects, mostly from Morocco. A friend gave several thousand named insects collected by Franz Werner in Algeria and Morocco; among the Orthoptera are a few types.

Mr. W. S. Brooks during his trip to Jamaica obtained a large number of small insects, several hundred species being new to the collection. Dr. J. Bequaert presented several hundred species from Africa and Yucatan.

For lesser gifts we are indebted to Messrs. W. J. Brown, T. D. A. Cockerell, J. H. Emerton, G. Fairchild, T. H. Hubbell, R. Korsakov, Arthur Jacot, C. W. Johnson, E. MacLeod, A. P. Morse, Harrison Smith, Manuel Valerio, E. B. Williamson, and Miss E. B. Bryant.

From Mr. E. Varas we received about 500 Chilean Hymenoptera in exchange. The curator has collected about 2,000 local insects and arachnids.

The greater part of the curator's time, as well as that of the preparator, has been devoted to mounting, labeling and assorting over 20,000 specimens found over a year ago in storage; many thousands of specimens had to be discarded, owing to their condition, or were given to the Bussey Institution for the use of students. The clearing up of this accumulated material (except Lepidoptera) is now largely accomplished, and by another year it is hoped to have all that is valuable incorporated in the general collection.

Transferring specimens from boxes to be lined, and transferring alcoholic material to upright vials has occupied a great deal of time. The preparator has lined with sheet cork about 600 of the old boxes,

only a few hundred remain unlined. Two hundred double trays for vials were added during the year.

The most important event of the year was the addition of 1,000 new drawers, and cases for over 650. The new drawers have been glassed, fitted for use, and several hundred already contain insects.

The types of 125 species were verified and marked. The usual inspections show the collection in good condition.

Miss Bryant has continued sorting spiders, mostly exotic, determined certain forms, numbered the trays, and made a generic index to the spider collection. She has also completed her work on the New Zealand spiders.

Mr. Carpenter has catalogued more of the fossil insects, returned and installed the fossil ants loaned years ago to Dr. Wheeler, finished a paper thereon, and also one on certain Panorpidae.

I have arranged the Myriopoda, numbered the trays and made a general card index, so that one can readily find the named material. I have also numbered the drawers and begun card indices for the Neuroptera and Nearctic Orthoptera. The foreign Orthoptera have been arranged geographically in families. The Nearctic Orthoptera have been arranged, partly by the Scudder Catalogue and partly according to notes kindly furnished by Mr. Hebard. In this collection a series of not more than 30 to 50 specimens is kept; where there was more they are in a duplicate collection.

Mr. T. H. Hubbell was here for over a month sorting and determining the unnamed Nearctic Orthoptera, and helped greatly in placing many species. For this work the University of Michigan Museum was given several thousand duplicates, including paratypes of over 100 species, and they, in turn, gave us about 120 specimens with a dozen species new to our collection. The United States Orthoptera are thus in excellent order.

In Lepidoptera many thousand have been transferred to new boxes, and the Brazilian and part of the oriental material spread by the preparator, Waldo Banks, who left on June 30. The curatorial work has permitted but little time for study. The Costa Rican spiders sent by M. Valerio were named and four new ones described, a paper on Bornean Phalangida completed, a short article on Dr.

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Bequaert's African Neuroptera written, and some determinations made in Neuroptera and Psammocharidae.

Mr. Darlington returned from Colombia in late June, and was given space to work over his recent collections. Visitors to study the collection (besides local) were F. Blaisdell in Tenebrionidae; W. J. Brown, Coleoptera; J. B. Corporal, Cleridae; Morgan Hebard, Acrididae; and E. P. Van Duzee, Hemiptera.

REPORT ON MAMMALS

BY G. M. ALLEN

It is a matter of great satisfaction to record that throughout a considerable part of the year the services of an assistant to help in cleaning past accumulations of osteological material, have been available, in part through the generosity of Mr. Harold J. Coolidge, Jr. Many skulls and skeletons that have long awaited attention are now prepared, numbered, labeled and available for study. Much more remains to be done, but already the specimens previously in the old "post office" have been cleaned, and a quantity of other specimens that have for a long time been unavailable and blocking valuable space. The outdoor sand-box for treatment of bones too large to boil has proved successful in cleaning. In addition, a number of the alcoholic specimens that have reposed for two generations in the basement have been sent to Ward's for preparation, with the result that they are now available as excellent skeletons. Much progress has been made, too, in reducing the past accumulation of salted hides, so that now a large part is tanned. The proper storage of these tanned skins is a matter still awaiting attention.

Grateful thanks are due Miss Helen Hunt of Milton, who has volunteered her help in cataloguing and in other miscellaneous routine matters. For five months she has generously given her full time to this work, with the result that recent accessions are now entered in the catalogue as well as in the card-catalogue so far as identified.

In addition to the usual work of identifying material received, selecting exchanges, and distributing catalogued specimens in their places, I have finished identifying the collections of birds and mammals obtained on Dr. R. P. Strong's expedition to Liberia, and have prepared reports for publication.

Important exchanges have been made with Dr. N. Kuroda of

Japan, the Russian Academy of Sciences, the Zoölogical Museum of the University of Moscow, and for a series of Pikermi fossil mammals with the British Museum (through Mr. Stetson). From the American Museum of Natural History was received a series of specimens of Asiatic Carnivora in continuation of previous agreement; from Dr. B. Vinogradov a specimen of the rare genus *Aschizomys*; from Dr. A. Fortuyn some common Chinese species; and through purchase an excellent series of New Mexican species, several previously unrepresented in the collection.

Specimens were loaned for study to the Harvard Medical School, the U. S. Biological Survey, the Museum of Vertebrate Zoölogy (Berkeley, California).

A monographic Revision of the genus *Gorilla* by H. J. Coolidge, Jr., based in part on studies made here, was edited and seen through the press.

REPORT ON THE MOLLUSKS

BY WILLIAM J. CLENCH

The museum collection of mollusks has been increased materially during the past year by the acquisition of three notable collections.

The N. W. Lermond collection of 11,000 lots was obtained by purchase during the late summer of last year. This collection is very rich material from Maine and Florida, the two states in which Mr. Lermond has resided for many years. Through the generosity of a friend, the J. N. Farnum collection of *Liguus* was purchased. This collection, comprising only a single genus, is very complete for the Florida forms, containing a large amount of material from the hitherto unknown central Everglade region. Four new forms have been described and another yet remains to be described from material contained in this collection. Many specimens are from localities now destroyed by fire, building operations, or land clearing, and it would be impossible to replace them.

One of the few collections made by T. Bland was obtained by exchange from Amherst College. This one, comprising 1,545 lots, is made up largely of West Indian land shells, many of which are type material received by Bland from contemporary workers of his time. The collection has considerable historical value.

The curator made a trip to Soledad, Cuba, during the month of September, to continue the work started the previous year, on a general survey of the region and a study of the distributional factors pertaining to the molluscan fauna. A four weeks' trip was also made to the Everglades of Florida to study, under natural conditions, the life histories and distribution of *Liguus*, a genus of tree snails.

Mr. W. S. Brooks and Mr. Roger Pierce collected a fine series of mollusks in Jamaica, which has filled in many gaps in the Museum's collection from that region.

The total accessions from all sources for the year number 19,697,

a considerable increase over that of last year. Catalogued entries have added nine holotypes, eighty-three paratypes and eight co-types. The collection as well has been increased by one family, four genera and one hundred and three species.

At the beginning of the museum year, the Mollusk Department was moved from its old quarters on the fifth floor to the three rooms it now occupies on the fourth floor of the northeast wing. This move made possible the storage of the collection in proper order in two rooms with ample expansion space for the future. The third room is devoted entirely to an office and study room, with splendid facilities for work.

Grateful thanks are due to Mr. Allen Archer who has given much of his time to voluntary aid in the department. Thanks are also due to Mr. Gilbert Banks, an assistant in the department, whose accuracy and neatness added much to the amount of work accomplished during the past year.

The Museum is indebted to the following people who have kindly donated much material to the collection: Miss H. M. Robinson, Messrs. G. M. Allen, A. Archer, F. C. Baker, G. Banks, T. Barbour, J. Bequaert, H. B. Bigelow, R. E. Bowen, W. S. Brooks, F. Bruce, F. G. Cawston, W. F. Clapp, U. Dahlgren, A. Dawson, G. B. Fairchild, J. N. Farnum, V. W. Foster, H. R. Hill, C. L. Hubbs, R. T. Jackson, C. W. Johnson, N. W. Lermond, A. Loveridge, J. E. Morrison, A. Navez, G. Nelson, P. T. Putnam, P. S. Remington, J. H. Sandground, G. Salt, W. C. Schroeder and T. van Hyning.

REPORT OF THE RESEARCH CURATOR OF ZOÖLOGY

BY LUDLOW GRISCOM

I have had little or no work to do this year with exhibitions and consequently I have had considerable time for research work. An interesting task was the overhauling of the collection of alcoholic birds with Mr. Peters. Great series of birds, largely unlabeled and many hopelessly ill preserved, have lain for fifty or more years in jars or tins of alcohol in the basement. It was necessary to go over all these with care, saving the relatively small amount of worthwhile material, and destroying the remainder. We were amply repaid by the discovery of specimens of several North American birds now extinct, the type of a North American Sparrow, and a Rail and a Fruit Pigeon from Polynesia, new to science, and undoubtedly extinct for years.

With this exception my activities for the year can be arranged under three main headings.

1. The routine work connected with purchases, finances, sales and exchanges of publications takes part of my time.

2. During the year I have seen through the press eleven bulletin articles and one memoir, and have assisted with others. A great improvement has taken place in our funds for publication. All sales of publications and duplicate library books and pamphlets are now allowed to accumulate in a Special Publication Receipts fund which can be carried over from year to year. The sale of a complete set of our Memoirs and Bulletins to a library in China was an outstanding event of the year, particularly as it will probably be impossible to fill a similar order in the future, as five bulletin articles are now out of print. With all but two of the Alexander Agassiz Expedition reports now printed, the major part of the income can be used for general publication. These two factors account for the great difference between this year's output of publication compared with the preceding year.

3. During the fall and early winter a valuable collection of birds made on Mt. Pirri in extreme eastern Panama was identified and reported upon. This was secured through the good offices of Dr. F. M. Chapman. In March I had the good fortune to see my old friend Dr. Jonathan Dwight in New York a week before his death. For years we had planned to collaborate in the study of his great collections of Central American birds, but his prolonged illness and my removal to Cambridge had rendered these plans abortive. It was practically his dying wish that I should study and report upon these birds, and he lived long enough to instruct the authorities of the American Museum of Natural History to send his collections to Cambridge. At his death his collections were bequeathed to the American Museum, which has continued the arrangement made with Dr. Dwight. Accordingly some 8,000 specimens arrived about the middle of March, and to date about one quarter of the collection has been determined. I am to write a memorial volume on the birds of Guatemala, which will be published by the American Museum. The Museum of Comparative Zoölogy is to get a full series of duplicates, which will amount to about one thousand specimens, including practically all the known autochthonous forms. Study of this material has already suggested our describing new forms from other parts of Central America.

During the year the Museum took over a promising collector, Mr. H. Wedel, who had been maintained most successfully for our benefit by Mr. Kennard in the Almirante region of western Panama. He has now proceeded to the Caribbean side of extreme eastern Panama, a region previously unknown ornithologically. Four lots of birds have already arrived containing some undescribed forms, others new to the collections, and many new to Panama.

During the course of the year I was elected to the editorial board of *Rhodora*, and also became the section editor on birds for *Biological Abstracts*. Active local field work in conjunction with the state ornithologist and various clubs and societies has been continued.

REPORT ON REPTILES AND AMPHIBIANS

BY A. LOVERIDGE

Perhaps the most outstanding incident of the year was the arranging of an exchange with the British Museum which added over a hundred well-established species to the collection. While it was found impossible to reach the high peak of additions achieved last year, the gain of 217 species or races is unusually high and has only once before been surpassed.

Several hundred specimens were received by exchange from eleven institutions other than the British Museum.

The most noteworthy accessions were a Mexican collection of over 500 specimens secured by W. W. Brown; 336 specimens forming part of the Burden-Dunn East Indian collection; 275 Guatemalan reptiles and amphibians collected by A. W. Anthony and 253 reptiles and amphibians resulting from Dr. Franz Werner's expedition in North Africa. All these collections were purchased and presented to the museum by a friend.

Twenty-seven other donors contributed specimens. Principal among these should be mentioned F. H. Hardwick's coöperation with Mr. W. S. Brooks in securing Galapagoan reptiles, two of which were new to the collection. Dr. E. R. Dunn presented over a hundred specimens from his Central American trip and Hermano Nicéforo María enriched the collection by gifts of Colombian species. Dr. Thomas Barbour's cruise among the West Indian islands, besides filling in gaps in the collection, added well-preserved series of many poorly represented, interesting, insular forms.

In addition to the routine cataloguing and card-indexing of material, the whole of the lizard collection was examined and given fresh alcohol. The old snake collections in tanks were transferred to jars and incorporated in the taxonomically arranged series. The salamanders were very thoroughly gone over, all alcohol changed and the jars rearranged in more commodious cases.

A good deal of the assistant curator's time was occupied with the compilation of a report on the East African herpetological collections of the United States National Museum. This was finished in June and the collection of several thousand specimens has been returned to the Smithsonian Institution.

As usual, a number of visitors have utilized the collection. Among these might be mentioned Dr. H. Babcock, Dr. A. M. Boring, Mr. E. C. Burt, Dr. E. R. Dunn and Mr. C. H. Pope.

Collections, often numbering several hundred specimens, have been loaned to institutions both at home and abroad.

A census of the collection is appended: —

	Genera	Species	Gain Genera	Gain Species
Rhynchocephalia	1	1	0	0
Crocodylia	6	19	0	0
Chelonia	57	178	1	4
Lacertilia	278	1,869	2	114
Ophidia	295	1,311	1	44
Amphibia	209	1,295	0	55
	—	—	—	—
Totals	846	4,673	4	217

Material was received from twenty-eight private persons by gift and from twelve other museums by exchange.

REPORT FROM THE DEPARTMENT OF PALAEONTOLOGY

By H. C. STETSON

Owing to the absence of Professor Raymond in Alberta on a Shaler Memorial Expedition, the reports on vertebrate and invertebrate palaeontology will be included under one head.

The exhibits in the Invertebrate Room are almost completely rearranged and remounted with the object of making them more useful to the students in Geology, Palaeontology and Zoölogy. Shelves have been given up in favor of a flat panel background, with the individual specimens mounted on plaster plaques, cut to size. The appearance of the room is much improved by this method of mounting, particularly as the great majority of specimens are small.

The old stratigraphic arrangement has also been abandoned. Each class is grouped separately, with the basis of classification and the morphology illustrated by specimens and photostats placed at the beginning of each class. Wherever possible a family tree, showing evolution within the group, has been included. Space is left at the top of each panel for restorations illustrating life habits, or matters of historical interest in connection with the group. Descriptive, and not merely taxonomic, labels are used for the individual specimens, with a large one for each class.

The mounting is being very well done by Mr. W. E. Shevill.

Mr. George Nelson has completed three beautifully executed mounts, Pteranodon, largest of the flying reptiles, Mesoreodon, a Miocene oreodont, and Dinichthys, one of the huge Devonian armored fishes. This last mount was particularly difficult, as the plates had to be broken and rebuilt many times in order to get an exact fit. This called for great skill and patience, but the final result differs in many important respects from other restorations,

and is one of the most valuable specimens in the Museum. Mr. Nelson has also mounted many smaller specimens.

Further search in the storage collection has yielded much valuable material. The most important fossils discovered in this way are: *Homoeosaurus*, a lizard from the Lithographic limestone, showing squamation which was heretofore unknown; a perfect skull of *Diplocaulus*; and an almost complete skeleton of a large *Diadectes*, both from the Texas Permian. Professor E. C. Case made two trips from the University of Michigan to assist in the assembling of the latter, which has proved to be one of the best skeletons of this rare reptile ever found.

A friend has again presented the Museum with the fossils collected in South Dakota and Nebraska by Erich M. Schlaikjer. The most notable of which are a complete skeleton of *Mesohippus*, numerous *Oreodon* skulls, a skull of *Caenopus*, and a slab of *Diceratherium* bones from Agate Springs, Nebraska. This slab is one of the largest if not the very largest ever taken from the quarry and it measures five by eight feet and is unbroken. It will be on exhibition in the entrance hall. Schlaikjer is again in the field and reports several good finds. We wish especially to thank Mr. Harold J. Cook for his most generous assistance to the Museum party on their two trips to Agate.

The same person has also presented material from the Pleistocene of Florida, which includes several complete box-turtles, tapir, deer and rodent dentitions and a complete pair of jaws of *Equus complicatus*. The same donor has also given five beautiful specimens of *Drepanaspis* from the Gemünden slates, a fine head of *Bos primigenius* from Westphalia and several models of Devonian fishes by A. H. Bishop or the British Museum.

Professor William Patten of Dartmouth College very generously presented four fine specimens of *Bothriolepis*, thereby greatly improving the exhibit of *Ostrocodermes*.

Other accessions to the collections include forty complete individuals of the rare trilobite *Philipsia*, from the Pennsylvanian of Kansas by purchase, fragments from the Texas Permian by exchange with Professor E. C. Case; a skull and jaws of *Entelodon* by exchange with the Amherst Museum; several sharks and arthrodires

from Caithness, gift of the Scottish Geological Survey; a series of mammalian fossils from Pi Kermi, Greece from the British Museum, by exchange; several fish from the Old Red Sandstone and a box of Downtonian material, the gift of another friend of the department.

Messrs. Erich Schlaikjer, W. E. Shevill, Herbert A. Frye, and Andre Ajemian have done excellent work during the year, assisting in the cleaning, restoring and mounting of specimens.

REPORT ON THE HELMINTHOLOGICAL COLLECTION

BY J. H. SANDGROUND

Contributions by Professor Agassiz, founder of our Museum, formed the nucleus of what was probably intended to be a comprehensive collection of parasitic entozoa, one of the first to be established in this country. That considerable interest was directed to this important economic field of zoölogy, now constituting a specialized branch of medical zoölogy, is attested by the contributions of parasitic worms from man that were made by various physicians of Boston and which are still preserved in the collection.

Early in the development of the Museum, D. F. Weinland was called from the Museum of Berlin, where there were already deposited several large collections by early students of systematic helminthology, to assist in the study of the North American fauna and, in 1858, there appeared under his name the first comprehensive treatise on the human cestodes. Weinland records having made extensive examinations of hundreds of American animals for helminths but what became of this collection is unknown.

In September, 1928 I was appointed to revise and extend the collection of parasitic worms in the Museum in conjunction with my work in the Department of Tropical Medicine at the Medical School.

Since the collection had passed out of the keeping of W. McC. Woodworth at the beginning of this century, and failing the attention of one specially interested in the group, it had become one of those neglected orphans associating with such alien groups as the Annelids and marine forms such as the Gephyrea, Sipunculoidea, etc., that in earlier days were classed under the blanket title of Vermes.

When the collection was handed over to me, it consisted of five trays holding about 200 bottled specimens. Many were ill preserved. Few were accurately identified or carried such necessary informa-

tion as the specific name of the host, its location in the host and its locality, others were unlabeled or bore numbers only. Even the finding of an incomplete sheet catalogue did not provide much of the essential information required and consequently much of the material had to be discarded. There remained, however, a number of interesting forms which include types of North American Gordiaceae described in 1898 by Montgomery in a bulletin of the Museum.

As a result of the rapid progress that has been made in helminthology during the last fifty years, practically all of the material in the collection had to be reexamined microscopically and the forms relegated to their proper positions in modern taxonomic schemes.

To extend the collection, I have donated my own specimens, largely from South African domesticated animals and from man, and those which I was able to secure during my investigations in Yucatan during the early part of the year, when I acted as parasitologist to an expedition sent out by the Medical School. The collection has been further augmented by several new forms secured by Mr. Arthur Loveridge in Tanganyika and by the material gathered by various members of Dr. Strong's Harvard Trans-African Expedition. Also, through the kindness of Dr. Herbert Fox of the Philadelphia Zoölogical Society, paratypes of several nematode species from animals dying in the Philadelphia Zoo have been donated. To increase the collection, at least to the point that it will contain examples of all the major genera of parasitic worms, it is hoped eventually to inaugurate a system of exchanges with other institutions and scientists that prosecute work in this field.

At present the helminthological collection is naturally still comparatively small and patchy. Our new catalogue lists 93 species of Nematodes belonging to 63 genera, 9 species representing 8 genera of Acanthocephala, 17 species belonging to 12 genera of Trematodes and 26 species of 17 genera of Cestodes.

In man himself considerably more than 100 distinct species of helminths have been described. While a number of these are merely incidental parasites probably belonging to other species of hosts, many are specifically restricted to the human.

Practically all of the higher animals act as hosts for helminths, and, as in man, systematic examinations often reveal a large series

of distinctive parasites. It is obvious, therefore, that the number of species of parasitic worms, approaches, if it does not as several students of the subject claim, surpass the combined number of all species of vertebrates.

The value of studies in systematic helminthology, as an aid to the solution of problems of phylogeny of the host animals and zoogeography, has already been demonstrated by several able zoölogists. It is hoped that greater advantage will be taken of this method by field workers who have access to helminthological material in the course of their collecting. A brief memorandum, a few mimeographed copies of which are available for collectors, has been prepared with a view to outlining the most satisfactory procedure for the collection and preservation of parasites. Already several students accompanying zoölogical expeditions to various parts of the world have consented to collect on our behalf. In this way it is hoped to receive further interesting and valuable contributions.

REPORT ON THE FISHES

BY N. BORODIN

When I came to the Museum of Comparative Zoölogy during the last days of August, 1928, the laboratory was crowded with the bottles of fishes which had been removed from the exhibition cases, as well as those of an enormous number which had been studied and re-identified by Dr. Carl Hubbs who, under the coöperative arrangement with the University of Michigan, had spent several months working over certain families, revising them for this Museum and selecting duplicates for his own. Re-identification of American Cyprinidae and Centrarchidae by Dr. Hubbs was certainly a valuable work and helped to put the American fishes of these two families in right shape. All these hundreds of bottles of fishes had to be sorted, several hundreds of them (U. S. Bureau of Fisheries collection) to be catalogued and supplied with M.C.Z. numbers and finally put into the study series according to a revised system. This took several months.

Then came the task of examining the bottles through the whole storage collection, often refilling or adding fresh alcohol, and discarding all specimens dried through neglect, and supernumerary duplicates. Six hundred and sixteen such specimens were eliminated.

A most serious detriment to the state of the whole collection of fishes in the Museum of Comparative Zoölogy was the fact that they were much crowded. All trays had been filled to their capacity and all sections of the cases with trays, in most cases double the number that could be conveniently stored.

According to Dr. Barbour's idea, two more large rooms have been repaired and supplied with cases and assigned for the extension of the fish collection. It has been decided to use one room exclusively for Elasmobranchiae and another for Acanthopterygii, especially the last families in the system (Ballistidae, Ostraciontidae, Molidae). In connection with this, many families have been

removed from their former places and the free places were used for the extension of the remaining families.

The collection of sharks and rays was found to be in very bad condition, especially the anatomical preparations. This large material has already been used by Dr. Garman in preparing his work on the Plagiostomia. Many bottles (147) have been discarded, and in the new cases of the new room only good or especially rare specimens have been placed. And even after this operation, the collection of Elasmobranchiae and the preparations fill almost the whole new room V (62). Only one case remains empty for expansion. Garman's system, as developed in his work on the Plagiostomia, was used in the rearrangement of this collection.

Emptied cases in the old room were used for the extension of two large and much too crowded families — Percidae and Serranidae. Into the other new room IV (53) fishes of Sciaenidae, Ballistidae, Ostraciontidae and the preparations of the Teleostean fishes were transferred. There still remain unoccupied five cases for further extension of the collection.

The removal of several families from the old fish room permitted the rearrangement of the rest of the neighboring families, especially the families Siluridae and Loricaridae, which are rearranged according to Eigenmann's work on the Fresh Water Fishes of British Guiana.

Important changes have been made in the whole system of arrangement, in order to make easier the finding of needed species, and the present order of the families is, in most cases, after the system adapted by Boulenger in his *Fishes in the Cambridge Natural History*, Vol. V.

I have prepared an *Index to the genera of the whole collection*, which, in the absence of a card catalogue, is a convenient guide.

Among the many five gallon and ten gallon copper containers, some were found to contain important collections of fishes, namely two large containers with cotypes of many species presented to the Museum of Comparative Zoölogy by the Smithsonian Institution in 1881—they had been catalogued but left in the containers; a good collection of European fishes presented to the Museum of Comparative Zoölogy by the Rigs Museum of Stockholm in 1888; and

fishes collected in 1904–1905 by Alexander Agassiz on the “Albatross.” All these fishes have been bottled, labeled and put into their proper places in the cases. There are still many more containers to be opened, their contents to be examined.

Several unidentified collections are still to be worked on. Some of them must be of value, as for example, the Barbour collection of East Indian fishes.

At the request of Dr. Barbour, I worked on the genus *Leporinus* and *Anostomus* of the Characinidae, some manuscript material concerning them was left unfinished at Dr. Garman’s death, and on the collection of deep-sea fishes made in 1928 by Mr. Iselin.

It must be stated that there is still the following work to do:

1. Completing the *Index of genera and families* and preparing an alphabetical index to it.
2. Filling the catalogue with many thousands of missing names of numbered and catalogued specimens.
3. Excluding from the catalogue, which is at present in six bound volumes, specimens discarded during the work of reorganization.
4. Examining the contents of the copper containers of fishes and bottling the specimens which are found of scientific value.
5. Relabeling many thousands of bottles, to which task must be added the cleaning from the bottles of a half century’s accumulation of coal dust and dirt.

Important exchanges were effected with the British Museum and with the Pacific Fisheries Research Station at Vladivostok. Many specimens have been loaned to Dr. Hubbs of the University of Michigan, to Mr. Koelz of the same institution and to Dr. Parr of Yale University. Material for anatomical study was supplied to Dr. Lewis of the Harvard Medical School and Dr. C. Forster Cooper of Cambridge University, England.

Accessions: I visited Bloomington, Indiana, and succeeded in recovering 47 bottles containing types which had been borrowed just before Dr. Eigenmann’s death. Beside Mr. Iselin’s collection, already mentioned, a good series of fishes from the Chamelecon River, Honduras, sent to the Museum by Dr. Wilson Popenoe,

also fish from Labrador by Mr. O. L. Austin, Jr., from Cuba by Mr. W. J. Clench, from the Galapagos by Mr. W. S. Brooks and other specimens from Mr. George Nelson and Mr. Frederic Kennard.

Dr. A. W. Herre of Stanford University visited the Museum to examine the collection of Sardines while Dr. Parr of Yale visited the Museum twice and Dr. A. Derjavim of Vladivostok once. As already mentioned, Professor Hubbs spent the entire summer of 1928 in the Museum.

REPORT ON BIRDS' EGGS AND NESTS

BY W. S. BROOKS

Work on the collection of eggs, begun a year ago, is progressing slowly but in a satisfactory manner. A certain amount of delay is in consequence of my collecting trip during the winter. The major factor in retarding progress, is, however, the indescribably chaotic and filthy condition of the collection as it was found. Much material has been rendered valueless through exposure to the sun or dirt, or both, and the greater part of a once valuable collection of nests and eggs from the Cayman Islands, impossible to replace, appears to have been submerged in rusty water as a preserving medium.

Thus far the collection shows a very fair representation of North American species largely from the William Brewster bequest, with certain outstanding items such as Californian Condor, Eskimo Curlew, Passenger Pigeon, and Carolina Paroquet (laid in captivity). Foreign species are very poorly represented.

Mr. A. C. Bent has generously given certain specimens. A few eggs have been purchased to build up the collection as to families and genera, and it is hoped to carry this on as far as means and opportunity are presented.

REPORT ON FOSSIL ECHINODERMS

BY ROBERT TRACY JACKSON

At the request of the Director I undertook the care of the collection of fossil echinoderms and entered on the work with pleasure. In accord with the plan the collection of fossil echinoderms was transferred from the general invertebrate collection on the first floor of the Museum to one of the new rooms on the fourth floor. The new room was obtained by flooring over a gallery, fitting up the wall exhibition cases as storage cases and in addition building a double tier of twenty units across one end of the room.

The collection was moved to its new quarters in the early autumn. Much of the available time of the curator was spent in getting the collection in order and was of the nature of preliminary work. The collection of fossil echinoderms is an extensive one and fills more or less completely 738 trays, distributed as follows:

Cystoidea	50 trays
Blastoidea	19
Crinoidea	422
Astroidea and Ophiuroidea	10
Echinoidea	237
	<hr/>
	738

The collection is all in cases, arranged so that there is reasonable room for expansion, and is all accessible. In the Echini there is a very large number of plaster casts of fossils, some of these are important and others are of doubtful value.

The trays have all been fitted with snap labels so-called. These are cardboard labels with a deep notch cut in each end and are snapped beneath the head of two upholsterer's large-headed nails. They are thus held firmly in place, yet can be readily changed. A simple machine used ensures exactness in driving the nails, which

is an essential feature. This system of tray labels was adopted in the Invertebrate Palaeontological Department in 1886, when the curator was assistant to the late Prof. Alpheus Hyatt. It has stood the test of time.

The most important accession of material in the year was the gift by Mr. Benjamin Walworth Arnold of a fine series of some 367 specimens, including 41 species of fossil Echini from Jamaica. This collection includes many paratypes and is illustrative of Messrs. Arnold and Clark's memoir: *Jamaican Fossil Echini*, recently published by the Museum.

Dr. Victor Van Straelen of the Brussels Museum kindly sent an excellent cast of *Lovenechinus anglicus* Jackson, the original of which is published in the curator's recent memoir on Palaeozoic Echini of Belgium. He also sent a cast of the type of *Medusina boulengeri* Van Straelen, a remarkable Medusa recently found in the Lower Carboniferous of Denée, Belgium. A small collection of choice Tertiary Echini from Florida was purchased of J. B. Litsey. In addition fossil Echini were received from Dr. T. Barbour, Dr. Mario Sanchez Roig, Mr. W. J. Clench and the curator.

REPORT ON THE LIBRARY

BY ELEANOR K. SWEET

From August 1, 1928 to July 31, 1929 inclusive, 1,997 volumes, 2,102 parts of volumes, and 1,640 pamphlets have been added to the Library.

The total number of volumes in the Library is 68,450; the total number of pamphlets 77,237.

Four hundred and fifty-one volumes have been bound and 456 pamphlets put into covers.

From Harvard College Library we have received 136 new titles. Other contributors of twenty or more titles were Nathan Banks (224 titles), Thomas Barbour (207 titles), Henry N. Bigelow (130 titles), George H. Parker (120 titles), William M. Davis (120 titles), Outram Bangs (28 titles), and Peabody Museum (20 titles).

From the Garman library, of which most of the bound works have been catalogued, we have received 625 volumes and 97 pamphlets. The unbound papers and reprints are now being catalogued.

In the course of the year many serials which have not been received since the War have been brought up to date; the Library at present receives regularly 964 current serial publications by exchange, purchase or gift.

PUBLICATIONS

FOR THE YEAR 1928-1929

(1 AUGUST, 1928 — 30 JULY, 1929)

MUSEUM OF COMPARATIVE ZOOLOGY

BULLETIN: —

Vol. LXVII

- No. 7. Birds collected by Dr. Joseph F. Rock in western Kansu and eastern Thibet. By Outram Bangs and James L. Peters. 72 pp., 5 plates. August, 1928.
- No. 8. A collection of birds from Oaxaca. By Outram Bangs and James L. Peters. 23 pp. October, 1928. Also title page and contents to volume.

Vol. LXIX

- No. 1. American Oribatid mites of the subfamily Galumninae. By Arthur Paul Jacot. 38 pp., 6 plates. January, 1929.
- No. 2. A rare Bramid fish (*Taractes princeps* Johnson) in the northwestern Atlantic. By Henry B. Bigelow and W. C. Schroeder. 11 pp., 1 plate. February, 1929.
- No. 3. Spiders from Panama. By Nathan Banks. 44 pp., 4 plates. February, 1929.
- No. 4. The squamation of *Homoeosaurus*. By Thomas Barbour and H. C. Stetson. 5 pp., 1 plate. February, 1929.
- No. 5. Color changes in two Cuban lizards. By Charles E. Hadley. 7 pp. February, 1929.
- No. 6. Some records and descriptions of new fresh-water Molluscs from Cameroon. By William J. Clench. 7 pp., 1 plate. March, 1929.
- No. 7. Vertebrates from the Corn Islands. By Peters, Allen, Barbour and Loveridge. 21 pp. April, 1929.
- No. 8. A collection of birds from Cana, Darien. By Ludlow Griscom. 41 pp. April, 1929.
- No. 9. Die Abyssale und Pelagische Gammariden. By A. Schellenberg. (Albatross Series). 10 pp., 1 plate. June, 1929.
- No. 10. Typical reptiles and amphibians. By Thomas Barbour and Arthur Loveridge. 55 pp. June, 1929.

MEMOIRS: —

Vol. L

- No. 2. A comparative study of the herpetological faunae of the Uluguru and Usambara Mountains, Tanganyika Territory, with descriptions of

new species. By T. Barbour and A. Loveridge. 179 pp., 4 plates. December, 1928.

No. 3. Notes on some species and subspecies of the Genus *Leporinus* Spix. By N. A. Borodin. 21 pp., 17 plates, 1 text fig. April, 1929.

Vol. LI

The Dinoflagellata: Dinophysoidae. By Charles Atwood Kofoid and Tage Skogsberg. 799 pp., 31 plates. December, 1928.

REPORTS: —

1927-1928. 40 pp. October, 1928.

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The Chinese forms of *Seicercus* of the *burkii* form-circle. *Proc. New Eng. zool. club*, **11**, pp. 1-5, May 8, 1929.

BANKS, NATHAN

Spiders from Panama. *Bull. mus. comp. zool.*, **69**, pp. 53-96, 4 pls., February, 1929.

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Amphibians and reptiles of the West Indies. *Zoöl. jahr.*, **11**, heft 4, pp. 436-442, November 17, 1916 (1929).

The largest reptiles. *Scientific monthly*, pp. 337-340, October, 1928.

New frogs of the genus *Phrynobatrachus* from the Congo and Kenya colony. *Proc. New Eng. zool. club*, **10**, pp. 87-90, November 13, 1929. With Arthur Loveridge.

- A comparative study of the herpetological faunae of the Uluguru and Usambara Mountains, Tanganyika territory, with descriptions of new species. *Mem. mus. comp. zool.*, **50**, no. 2, pp. 87-261, pls. 1-4, December, 1928. With Arthur Loveridge.
- On *Bothrops atrox* (Linné). *Bull. antivenin inst. Amer.*, **2**, p. 108, 1928. With Arthur Loveridge.
- The squamation of *Homoeosaurus*. *Bull. mus. comp. zool.*, **69**, 4, pp. 99-104, pl. 1, fig. 1-4, February, 1929. With Henry C. Stetson.
- Vertebrates from the Corn Islands. *Bull. mus. comp. zool.*, **69**, 7, pp. 138-146, April, 1929. With Arthur Loveridge.
- Address at opening of the University of Michigan Museum: *University museums building. Univ. of Michigan [Ann Arbor]*, pp. 19-25, January 11, 1929.
- On some Australian toads of the genus *Pseudophryne*. *Copeia*, **170**, pp. 12-15, April 30, 1929. With Arthur Loveridge.
- On some Honduranian and Guatemalan snakes, with the description of a new arboreal pit viper of the genus *Bothrops*. *Bull. antivenin inst. Amer.*, **3**, pp. 1-3, fig. 1, May, 1929. With Arthur Loveridge.
- A new frog of the genus *Arthroleptis* from the Belgian Congo. *Proc. New Eng. zool. club*, **11**, pp. 25-26, June 29, 1929. With Arthur Loveridge.
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The payments on account of the Museum are made by the Bursar of Harvard University, on vouchers approved by the Director or by a Curator especially authorized so to act. The accounts are annually examined by a committee of the Overseers. The income of funds which are restricted is annually charged in an analysis of the accounts, with vouchers, to the payment of which the incomes are applicable.

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Applications for facilities to work either at the Harvard Biological Laboratory and Botanic Garden at Soledad, Cuba, or at the Barro Colorado Island Laboratory in the Panama Canal Zone may be addressed to the Director. A limited number of Fellowships are available for workers at Soledad. Details concerning the concessions allowed to workers in the Canal Zone may be had upon application to the Director. This laboratory is administrated by the Executive Committee of the Institute for Research in Tropical America. Harvard is one of several institutions supporting the institution and the Director of the Museum at present is Chairman of the Committee.

Applications for the tables reserved for advanced students at the Woods Hole Station, of the U. S. Bureau of Fisheries, should be made to the Faculty of the Museum before the first of May. Applicants should state their qualifications, and indicate the course of study they intend to pursue.

